AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method of communicating with a target vehicle, comprising:

determining a line of sight vector ($\vec{v}$) between a reference vehicle and a target vehicle in a global coordinate system;

translating the vector ($\vec{v}$) into a vehicle coordinate system that is referenced to the reference vehicle to produce a translated vector ($\vec{i}_{\vec{v}_{local}}$); and

performing at least one of antenna selection, antenna steering and antenna gain calculation, based on the translated vector ($\vec{i}_{\vec{v}_{local}}$), to communicate with the target vehicle via at least one antenna.

2. (Original) The method of claim 1,wherein the at least one antenna comprises a plurality of antennas and wherein performing antenna selection comprises:

selecting an antenna of the plurality of antennas that maximizes a dot product $\vec{i}_{\vec{v}_{local}} \cdot \vec{i}_a$ for each antenna, wherein $\vec{i}_a$ comprises a vector, in the vehicle coordinate system, that points in a direction of a maximum gain of a corresponding antenna of each of the plurality of antennas.

3. (Original) The method of claim 1, wherein performing antenna gain calculation comprises:

determining a dot product $\vec{i}_{\vec{v}_{local}} \cdot \vec{i}_a$ and performing a lookup of resulting dot product values to determine a gain, wherein $\vec{i}_a$ comprises a vector, in the vehicle coordinate system, that points in a direction of a maximum gain of the at least one antenna.

4. (Original) The method of claim 1, wherein performing antenna gain calculation comprises:

approximating antenna gain as a low-order polynomial function of a dot product $\vec{i}_{\vec{v}_{local}} \cdot \vec{i}_a$, wherein $\vec{i}_a$ comprises a vector, in the vehicle coordinate system, that points in a direction of a maximum gain of the at least one antenna.

5. (Original) The method of claim 1, wherein the at least one antenna comprises a phased array antenna, wherein the phased array antenna has its own coordinate unit directions $\vec{i}_1$, $\vec{i}_2$ and $\vec{i}_3$, wherein $\vec{i}_1$ points along a surface of the phased array antenna in one direction, $\vec{i}_2$ points along the phased array antenna surface in an orthogonal direction, and $\vec{i}_3$ is equal to a cross product of $\vec{i}_1$ and $\vec{i}_2$ and is a unit vector normal to the phased array antenna's surface.

6. (Original) The method of claim 5, wherein performing antenna steering comprises:

commanding the at least one antenna to present a phase gradient of $2\pi/\lambda\ \vec{i}_1 \cdot \vec{i}_{\vec{v}_{local}}$ in a direction corresponding to the $\vec{i}_1$ unit direction and $2\pi/\lambda\ \vec{i}_2 \cdot \vec{i}_{\vec{v}_{local}}$ in a direction corresponding to the $\vec{i}_2$ unit direction.

7. (Currently amended) The method of claim 1, wherein the global coordinate system comprises at least one of a World Geodetic System (WGS) or ~~and~~ Military Grid Reference System (MGRS).

8. (Original) The method of claim 1, wherein translating the vector ($\vec{v}$) into a vehicle coordinate system comprises:

determining a unit gravity vector ($\vec{i}_{\vec{g}}$) in the vehicle coordinate system.

9. (Original) The method of claim 8, wherein translating the vector ($\vec{v}$) into a vehicle coordinate system comprises:

determining a unit magnetic field vector $\vec{i}_{\vec{m}}$ in the vehicle coordinate system.

10. (Original) The method of claim 9, wherein translating the vector ($\vec{v}$) into a vehicle coordinate system comprises:

converting the unit magnetic field vector $\vec{i}_{\vec{m}}$ to create a unit vector $\vec{i}_{\vec{N}}$ that is referenced to true north.

11. (Original) The method of claim 10, wherein translating the vector ($\vec{v}$) into a vehicle coordinate system comprises:

determining a unit vector ($\vec{i}_{\vec{E}}$) in the east direction.

12. (Original) The method of claim 11, wherein translating the vector ($\vec{v}$) into a vehicle coordinate system comprises:

creating a translation matrix $\vec{M}$ using $\vec{i}_{\vec{g}}$, $\vec{i}_{\vec{N}}$ and $\vec{i}_{\vec{E}}$.

13. (Canceled)

14. (Currently amended) A reference vehicle, comprising:
a transceiver coupled to at least one antenna; and
processing logic configured to:

determine a line of sight vector between the reference vehicle and a target vehicle in a global coordinate system, wherein the global coordinate system comprises at least one of a World Geodetic System (WGS) or ~~and~~ Military Grid Reference System (MGRS),

translate the vector into a vehicle coordinate system that is referenced to the reference vehicle to produce a translated vector, and

perform at least one of antenna selection, antenna steering and antenna gain calculation, based on the translated vector, to communicate with the target vehicle via the at least one antenna.

15. (Currently amended) A computer-readable medium containing instructions for controlling at least one processor to perform a method of communicating with a target vehicle, the method comprising:

determining a line of sight vector between a reference vehicle and a target vehicle in a global coordinate system;

translating the vector into a vehicle coordinate system that is referenced to the reference vehicle to produce a translated vector; and

performing at least one of antenna selection, antenna steering and antenna gain calculation, based on the translated vector, to communicate with the target vehicle via at least one antenna.

16-36. (Canceled)

37. (Currently amended) A system for communicating with a target vehicle, comprising:

means for determining a line of sight vector between a reference vehicle and a target vehicle in a global coordinate system;

means for translating the vector into a vehicle coordinate system that is referenced to the reference vehicle to produce a translated vector; and

means for performing at least one of antenna selection, antenna steering and antenna gain calculation, based on the translated vector, to communicate with the target vehicle via at least one antenna.

38-40. (Canceled)

41. (New) A method of communicating with a target vehicle, comprising:

determining a line of sight vector ($\vec{v}$) between a reference vehicle and a target vehicle in a global coordinate system;

translating the vector ($\vec{v}$) into a vehicle coordinate system that is referenced to the reference vehicle to produce a translated vector ($\vec{i}_{\vec{v}_{local}}$), wherein translating the vector ($\vec{v}$) into the vehicle coordinate system comprises:

determining a unit gravity vector ($\vec{i}_{\vec{g}}$) in the vehicle coordinate system,

determining a unit magnetic field vector $\vec{i}_{\vec{m}}$ in the vehicle coordinate system

converting the unit magnetic field vector $\vec{i}_{\vec{m}}$ to create a unit vector $\vec{i}_{\vec{N}}$ that is referenced to true north,

determining a unit vector ($\vec{i}_{\vec{E}}$) in the east direction,

creating a translation matrix $\vec{M}$ using $\vec{i}_{\vec{g}}$, $\vec{i}_{\vec{N}}$ and $\vec{i}_{\vec{E}}$, and

employing the matrix $\vec{M}$ to translate the vector ($\vec{v}$) into the vehicle coordinate system to produce the translated vector $\vec{i}_{\vec{v}_{local}}$; and

performing at least one of antenna selection, antenna steering and antenna gain calculation, based on the translated vector ($\vec{i}_{\vec{v}_{local}}$), to communicate with the target vehicle via at least one antenna.